MEANING OF MUSIC

an empirical study of psychological responses to Indian Music

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The present investigation is part of a larger study in the cross-cultural response to music. The research project was initiated by Mr. Charles Keil, USA. The purpose was to study the response of subjects from various cultural groups of different countries and to see whether a given piece of music elicited the same or different response.

Our experiments were confined to Indians. Though both Indian and Western music was used in this study, we are presenting here our results pertaining to only Indian music. Mr. and Mrs. Keil expect to publish a larger work which will include our results also.

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PREAMBLE

Music is one of the most affective of arts. Yet it is so nebulous that it is also the least amenable to conscious definition and analysis. Problems of melodic integration and emotional response have yet to be tackled in a scientific manner and reasonable solutions found.

The question of the relation of a *raga* to the mental state is an intriguing one and deserves careful experimental study. But the subject itself is not new. For instance, Bharata in his *Natyashastra* gives the *jatis* and their *rasas;* he also gives the *rasas* for instrumental music. However, we cannot, reasonably, take such statements as applicable to current music.

In modern times Bhatkhande has discussed this in his various writings (Brihaspati, 1959). Essentially his points are: Generally three *rasas* are in evidence in music — *sringara* (erotic), *veera* (valour) and *karuna* (pathos). *Ragas* with *Ri* and *Dha* are erotic, *ragas* with *ga* and *ni* are valorous and those with *ri* and *dha* are pathetic. This statement is, of course, a very general one.

Omkarnath Thakur rightly points out that it is not merely the notes which produce a mood but also various other factors like graces, tempo, octave levels and so on (Thakur, 1955). According to him those *ragas* moving in the upper octaves are never somber and dignified; they express faster emotions like anger, excitement and enthusiasm. Those with an emphasis on *Sa-Ma* relation are peaceful, and mature. *Ragas* of *Khamaj* group are erotic and lighter in vein. Those with *ri, dha* and *Ma* have pathos predominantly; and *ragas* with *ri, dha* and *ma* show tiredness, lack of enthusiasm, etc.

In the case of Hindustani music many of these factors determine also the time of singing the *raga* (Deva, 1967).

It is obvious that an aesthetic for music can only be a part of a larger aesthetic of the emotional expressions of man. Music, of course, will present its own special problems in a general theory of affective expression. A comprehensive theory of aesthetics of art was developed in India centuries ago. This was the magnificent concept of the *rasa.* A profound and penetrative analysis of the human mind, the *rasa* theory had its natural foundations in drama and literature. Since drama, literature and music were inextricable parts of a totality of artistic expression, it seems to have been assumed that the theory of *rasa,* which was eminently suitable to referential arts (like drama, literature, painting and dance), could explain the affective states of music (Deva, ibid).

But a close examination of the problem shows that music, *per se*, may not lend itself to such psychological analysis. While music may generate mental states parallel in neural dynamics to those definable in literature, it can in no way produce the referential syndromes of literature. (This in no way should be a discouragement but an enticing problem). This question becomes even more intricate when we consider the nature of Indian (classical) music as a stimulus. Even if we do not take into account the microstructure, the macrostructure of a *raga* is itself amenable only to a statistical definition: like a language (Deva, ibid.; Deva and Nair, 1966). Bound by traditional 'rules' of alphabet, syntax, punctuation and accent, a *raga* has only a generally definable form, each presentation of it being unique in a unique sense. Thus, experiments in the psychological responses require a large number of samples of a given *raga* for any reliable inference to be drawn; largeness of the size of such a sample of stimulus, in the case of a *raga*, has to be present besides the largeness of the size of the sample of respondents from a well-defined population of individuals in a culture under experimentation. Since both these aspects of sampling were delimited in the present experiment, the results thereof can, therefore, be considered as only exploratory.

EXPERIMENT

Introduction

Till recently, only general statements could be made about the intrinsic powers of music to arouse feelings and emotions in the listener. These general statements were based mostly on intuitive speculations or on the introspective reports of the phenomenon experienced. However, with the advent of the phonograph as well as tape-recording, and thereupon the better measuring devices of the behavioral sciences, many attempts were made in the West to understand the aesthetic aspects of music through controlled experimentation and empirical studies (Hevner, 1935; Ellis and Brighouse, 1952; Farnsworth, 1954; Henkin, 1955; Zimny and Weidenfeller, 1962; and, Keil and Keil, 1967). Most of these studies used Western musical excerpts as the stimulii, and almost all of them have used non-Indians as respondents to these stimulii, in their efforts to quantify and name the affective states. The present study is an effort to quantify the components of the feelings aroused by classical Indian musical (Hindustani) excerpts, in Indian listeners.

The aim of the present paper, which is the first in a series, is as already stated, to 'suggest' rather than to 'create', since the data reported are based on just one small portion of the musical form, the *raga,* as also on a very small sample of respondents; contributions to the theoretical framework of Indian musicology will follow in the next ones. Presently, it is planned only to exemplify a methodology in current use in the behavioral sciences and to anticipate that more workers in the field will pick it up and study more rigorously the power of various *ragas* to arouse specific moods viz., *Rageshri* for "evening, dark, somber, deep" etc.

The Measurement Technique

The technique employed for quantifying nature of moods aroused by musical samples was that of Osgood's "semantic differential" (Osgood, Suci and Tannenbaum, 1957). Semantic differential is a method of observing and measuring the psychological meaning of things, usually concepts (Kerlinger, 1964). Although everyone sees things a bit differently, sometimes very differently, there must be some common core of meaning, some common disposition, in all concepts (Deva, ibid.). Indeed the definition of 'concept' makes this clear. Now, by using musical compositions or excerpts of *ragas* as 'concepts', we could measure their psychological meaning, that is, the moods aroused by these, with the help of this technique.

Format and Administration

The instrument itself is simple and easy to use. It consists of a number of 'scales' — a set of symbols or numerals so constructed that the symbols or numerals can be assigned by rule to the individuals or their behaviour. Each of the scales is a bipolar adjective pair chosen from a large number of such scales for a particular research purpose. The individuals are asked to rate on these scales 'concepts' whose meanings are being measured (Kerlinger, ibid). Details of these adjective scales are given in a later section. The way in which it was administered to the present sample of respondents will follow shortly. The manner in which response is recorded on these scales by the respondents will become clear from the set of instructions given to them, which follow:

Instructions

Please do not look at the following pages until instructed to do so.

One of the purposes of this study is to find the words that people use to best describe certain feelings or moods they have while listening to music. On each of the following pages you will find a list of polarised adjectives. Your task is to encircle the one mark between each of these pairs that best describes the mood, feeling or atmosphere of the music you are listening to. First, decide which word best describes the mood; second, quickly estimate the extent or intensity of the adjective you have selected.

Here is an example, already marked (Table 1).

TABLE 1

Marked Example in a Semantic Differential Format

	1	2	3	4	5	6	7	
LARGE	·	·	·	·	·	·	⊙	SMALL
SAD	·	·	·	⊙	·	·	·	HAPPY
CALM	·	⊙	·	·	·	·	·	EXCITED
	Extremely	Quite	Slightly	Both or Neither	Slightly	Quite	Extremely	

(The middle dot should be encircled when *both* words are equally descriptive of the musical mood or when *neither* word feels right to you).

The music will change with each page but the list of adjective pairs always remains the same. Simply ask yourself as you listen to each piece of music, "what mood is being created?" We are not asking for precise mechanical descriptions. Just let your immediate feelings guide your marks. Try *not* to take special notice of particular phrases, accents or dynamics but *concentrate upon* describing the *overall feeling* of the music. Allow about two minutes per page — work fairly fast. Do not look back or skip around. You will be told to begin each page only after the music has been given a few minutes to establish its mood. (Keil and Keil, ibid).

Adjective Scales

Twenty-two adjective scales were used (Table 2). Most of the adjective scales selected might be used to describe a *raga*'s mood. The synesthetic basis of Indian musical theory (postulated relationships between *ragas* and colour, time of day, season, quality of movement and sensation) matches very nicely the with synesthetic logic behind Osgood's approach. The three fundamental dimensions that appear regularly in Osgood's many studies are, (1) "evaluative" (good-bad, usually being the pivotal scale), (2) "potency" (hard-soft) and (3) "activity" (active-passive); other factors as well may emerge in particular studies according to the properties of the stimulii or concepts being judged.

To diminish the pervasive quality of "evaluation" in our study, and to obtain a greater variety of factors or dimensions, the more obvious evaluative scales (good-bad, beautiful-ugly) were excluded deliberately. Emphasis was given on scales (including a graphic one) that might produce dimensions on the order of "activity", "tension" or "expansion", "potency", "receptivity". It was felt that adjective pairs of this sort would be more suitable to the description of the musical experience. The basic question in our minds was not, "How do you like this music?", but rather, "What do you think this music is like?" (Keil and Keil, ibid).

Musical Excerpts Used

Four musical excerpts were used. In each case the excerpt contained the *alap* — initial developmental movement prior to the entrance of *tabla* — of the *raga*. A brief description of these *ragas* is given below:

I. *Kafi*
Ascent: *Sa Ri ga Ma Pa Dha ni**
Descent: *Sa ni Dha Pa Ma ga Ri*
Emphatic notes: *Pa, Ri, Sa*
Characteristic phrase: *Pa Ma ga Ri, Ri ga Ma Pa, Ma ga Ri*
Time: Evening to midnight

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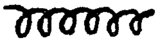
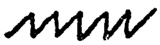
*The Indian set for notation given here corresponds to the following Western scale (of C):

Sa	**ri**	**Ri**	**ga**	**Ga**	**Ma**	**ma**	**Pa**	**dha**	**Dha**	**ni**	**Ni**
C	Db	D	Eb	E	F	F♯	G	Ab	A	Bb	B
	(C sharp)		(D sharp)			sharp		(G sharp)		(A sharp)	

TABLE 2

Final set of twentytwo adjective scales used[1]

SHALLOW	•	•	•	•	•	•	•	DEEP
MASCULINE	•	•	•	•	•	•	•	FEMININE
CALM	•	•	•	•	•	•	•	AGITATED
RIGID	•	•	•	•	•	•	•	FLEXIBLE
DRY	•	•	•	•	•	•	•	WET
EXPANDING	•	•	•	•	•	•	•	CONTRACTING
	•	•	•	•	•	•	•	
WEARY	•	•	•	•	•	•	•	REFRESHED
SWEET	•	•	•	•	•	•	•	BITTER
THRILLING	•	•	•	•	•	•	•	SOOTHING
SACRED	•	•	•	•	•	•	•	SECULAR
COOL	•	•	•	•	•	•	•	WARM
COLOURFUL	•	•	•	•	•	•	•	COLOURLESS
SOBER	•	•	•	•	•	•	•	DRUNK
ACTIVE	•	•	•	•	•	•	•	PASSIVE
CLOUDY	•	•	•	•	•	•	•	SUNNY
OPEN	•	•	•	•	•	•	•	CLOSED
TIGHT	•	•	•	•	•	•	•	LOOSE
USUAL	•	•	•	•	•	•	•	UNUSUAL
LIGHT	•	•	•	•	•	•	•	HEAVY
EVENING	•	•	•	•	•	•	•	MORNING
CONTROLLED	•	•	•	•	•	•	•	UNCONTROLLED
	Extremely	Quite	Slightly	Both or Neither	Slightly	Quite	Extremely	

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[1] Adapted from Keil, C. & Keil, A. (1967).

Miscellany:

It's mood is said to be "light, happy and contended, very gentle and harmonious, no depth". "Of shining whiteness, Kapika (Kafi?) who inspires lust, tenderly sits on the lap of her play-mate in the royal palace, fond of parrots she is dressed in blue and decked with jewels. She is the image of sensuosness" (Danielou, 1954).

"This *raga* is generally sung from evening to midnight and in the month of *phalgun* during any of the eight watches of the day. Songs of love (erotic) and devotion are sung in this *raga*. It is very well amenable for expressing the delicate feelings of the heart" (Thakur, 1959).

Thus, it depicts gaiety, is light, liquid, devotional, romantic, pleasant; religious joy.

II. *Misra Mand*

This is a variety of *raga Mand,* wherein notes normally used in *Mand* are employed. The following are details for *Mand:*

Ascent: *Sa Ri Ma Pa Dha*

Descent: *Sa Ni Dha, Dha Pa Ma, Pa Ga Ri*

Emphatic notes: *Sa, Ma, Pa*

Characteristic phrase: *Ma Pa Dha Pa Ma Ga Ri Sa Ri Ga Sa*

Time: Night

Miscellany: It is a *raga* of lighter moods and rarely, if at all, is serious music rendered in it. It is said to be derived from the folk tunes of Rajasthan. Thus, it is more dallying, no deep emotion; is erotic.

III. *Puriya Dhanasri*

Ascent: *Ni ri Ga ma dha Ni*

Descent: *Ni ri Ni dha Pa, ma Ga ma ri Ga, ma Ga ri*

Emphatic notes: *Pa, Sa, Ga* and *Ni*

Time: Evening, twilight

Miscellany: "The combination of *ri* and *dha* with *ma* indicates a mood of tiredness... and shows the weary mood of nature before sunset" (Thakur, 1955).

Thus, it gives a feeling of physical tiredness, longing, grave dark, and somber.

IV. *Rageshri*

Ascent: *Sa, Ga, Ma, Dha, Ni*

Descent: *Sa, Ni, Dha, ni, Dha, Ma, Ga, Ri*

Emphatic notes: *Ga, Dha*

Time: Second watch of the night

Miscellany: "One would like to call *Rageshri* not a *raga* but a *ragini*, considering its sweetness and softness" (*Raga* is generally considered masculine and *ragini* feminine). "*Rageshri* has a mood which is made of both the moods — steady and flirting" (Thakur, 1954).

Thus, it gives feeling of night, dark (no sunshine), somber, profound, deep and moving.

The recordings of these four excerpts were extracts from the performance of Ravi Shankar on sitar. As already stated, only the *alap* portion of the *raga* was used for the purpose of taking excerpts in each case.

Sample of Respondents

The data for the present experiment was collected from 37 students of the National School of Drama, New Delhi. The sample which consisted of both males and females had an age range of 20-30 years.

Experiment Proper

The 37 respondents were seated comfortably in an auditorium. The blanks of the format (Table 2), one for each of the excerpts, as also personal data-blanks and instruction sheets, were distributed among them. The respondents were asked to fill in personal data like name, age, etc. Then, they were asked to read the instructions with the experimenter who read them aloud. The marked examples of the instructions (Table 1) were also explained to the audience on a black-board. At this stage it was enquired whether any one of them had any question or doubt about using the format. The doubts were cleared by repeating the already marked examples only; discussion was intentionally avoided.

After having confirmed that the instructions were clear to the respondents they were given two minutes of music, to start with *Kafi raga* excerpt, to establish their mood, after which they were asked to get ready for marking. *Kafi raga* excerpt was repeated for two minutes and they were asked to record their impressions on the format during the replay. The same procedure was repeated for the remaining three excerpts. The time limits were strictly adhered to and all extraneous disturbances were meticulously kept under control during the experiment.

Scoring Procedure

The conversion of adjective choices of a sample of respondents into quantitative terms was the next step. The following illustration, wherein we have taken the case of Sad-Happy polarised adjective, makes quantizing or metrization clear.

Adjective	*Scoring Weight*
SAD	
· extremely	1
· quite	2
· slightly	3
· both or neither	4
· slightly	5
· quite	6
· extremely	7
HAPPY	

In terms of the above illustration, scoring for the example, already marked, in Table 1 will be: for Large-Small, 7; for Sad-Happy, 4; for Calm-Excited, 2. Scoring on similar lines, the basic quality of an individual's musical experience can be obtained on all the adjectives and on any 'concept' (*raga*) in quantitative terms. Once this was obtained, we could determine averages and measures of relationships between various adjectives through statistical manipulations, so as to form an idea of the group's musical experience which represented culturally determined common denominators of meaning. The nature of such statistical analysis is discussed in what follows.

METHOD OF ANALYSIS

In this section we will introduce briefly the statistical method of factor analysis which is basic to this study. Certain fundamental concepts like theory of psychological measurement, distribution of scores, averages or means, variance, standardized scores, the correlation coefficient, mathematical model for factor analysis, the correlation matrix, the method of principal components in factor analysis and the rotation of factors which are considered as 'elements' of the method of analysis under description are, however, included an as Addendum to the present paper, so as to facilitate ready reference. The present section as also the subject matter of the Addendum follows extensively the argument of Harmanin his, *Modern Factor Analysis* (Harman, 1960).

FACTOR ANALYSIS

Factor analysis is a statistical method of reducing a 'large' number of *empirical* indicators (in the present case, 22 adjective scales) to a 'small' number of *conceptual* variables known as factors. Here the term factor should be differentiated from the one used in arithmetic, where, a factor is one of the two or more quantities which, when multiplied together, result in the given quantity, e.g., six and four are factors of twenty-four. The factors yielded by the present statistical analysis, however, are meant to convey all the essential information of an original set of, say, n variables into some m components such that m is almost always less than n. Thus, the chief aim is to attain scientific economy of description. In other words, the purpose is to measure, objectively, the 'core' of some indicators, in the present case, polarised adjective scales ($n=22$). This does not mean that factor analysis discovers the "fundamental", since one gets out of this analysis only what one puts into it. Unless the indicators being analysed do not exhaustively describe the situation, the 'core' of that situation could not be called "fundamental", since, one gets out of this analysis only what one puts into it. Nevertheless, in an experiment with n greater than twenty or so the 'core' measured does have appreciable practical utility.

Factor analytic technique has been chiefly applied in the field of psychology for providing mathematical models — a simplified mathematical theory frequently postulated to explain the underlying behaviour of a body of observed data — for the explanation of psychological theories of human abilities (intelligence) and behaviour. At one time it was so bound up with psychology that it was considered as a psychological theory rather than a statistical method. But, at present its subject matter is better recognized as a branch of multivariate statistical analysis. And, it has been successfully applied in such other varied fields as political science, business, economics, biology and medicine (Harman, ibid.)

RESULTS

Three things will be covered under results. They are, first, the Profile for the excerpt, secondly, Table of Factor Loadings for the excerpt, and thirdly, Dimensions of Meaning as extracted by factor analysis for each of the excerpts. A brief description of these modes of presenting data follows:

Profile

The profile consists simply of the means of response of the participants to each of the bipolar adjective scales. It represents in quantitative terms the basic quality of the groups' musical experience. Further, the profile also enables us to derive plus or minus sign following the dimension "label" (under Dimension of Meaning) pointing to the pole of the dimension that seems to have been emphasised by the respondents; plotted averages below or above the mid-point (neither, or both) give an idea of the groups' leaning towards one pole or the other of the given bipolar scale. The profiles of the four excerpts in terms of the responses recorded by the group are given in Figures 1, 2, 3 and 4.

Table of Factor Loadings

The Table of Factor Loadings gives the loadings upon six or seven factors obtained through rotation by the varimax criterion (see Addendum). From the Addendum it may be noted that factor loadings represent the weight of each factor in the concerned empirical indicator, in this case each of the 22 bipolar adjective scales; larger the loading, more important is that factor in determining the total score on the indicator.

Only those factors accounting for more than 10 percent of the common variance (the principal components) and some smaller factors which were potentially interesting were included.

Tables of factor loadings for the present data are given in Table Nos. 3 4, 5 and 6.

Dimensions of Meaning

Dimensions of Meaning represent the final stage of presenting data, in which, the factors are 'named' by taking into consideration their weights on different bipolar scales, as extracted from the Table of Factor Loadings. For example, that factor which has heavy loadings (more than 0·60) on the scales, Colourful-Colourless, Active-Passive, Sweet-Bitter, Refreshed-Weary, Light-Heavy and Open-Closed, simultaneously, could be named as depicting *bhava* (affect) of the excerpt in question.

For naming the factors in the Dimensions of Meaning the loadings on the principal potentially important scales are shown thus: bold type adjective scales indicate a loading on that factor greater than 0·60, lower case adjectives a loading on that factor between 0·50 and 0·60, and lower case adjectives in parentheses a loading above 0·35 but less than 0·50. An asterisk indicates that the loading is "pure", that is, more than triple the loading on any other factor.

The Dimensions of Meaning for the four excerpts are given in Table Nos. 7, 8, 9 and 10.

The next section, is concerned with the interpretation of these results. The interpretation closely follows the style of presentation of data.

The 22 x 22 matrix of correlation, representing the basic data of the study, for each excerpt was not included in reporting data so as to save space.

Interpretation of Results

(Charts and Tables are given at the end of the article)

Kafi : Figure 1, Tables 3 and 7.

The intended mood of this *raga* as stated earlier is that it depicts gaiety, is light, liquid, devotional, romatic, pleasant and stands for religious joy.

From *Kafi*'s Dimensions of Meaning, the following description of the mood, feeling or atmosphere, in order of importance, seems to have been created in the respondents:

1. It has a 'lot of affect' (Factor I).
2. It is 'humid and cool' (Factor II and V).
3. It is 'soothing or tranquilizing' (Factor III).
4. It has 'depth' (Factor IV).
5. It does not 'agitate' (Factor VI).
6. It is 'not dense', but light (Factor VII).

A comparison of the mood 'created' with the mood 'intended' in the case of *Kafi raga* clearly establishes a similarity between the two. Gaiety, pleasantness and joyfulness is contained in the first Factor christened 'Affect' (भाव), through 'refreshing', 'sweet', 'colourful', 'active', 'open' and 'light'. An interesting part of this factor is a medium loading on the adjective pair, sacred-secular, with the mean tilting towards sacred. One way of interpreting this could be that this establishes the religiousness or devotional aspect of the 'Affect'(भाव) of this *raga*, although a separate factor "religious" would have established greater similarity between the created and the intended moods. Absence of such a separate dimension on religiousness may have something to do with the fact that religion has become a value-laden term in an age which is more or less biased towards behaviouristic science.

Further, that *Kafi raga* is light and liquid seems to have been fairly communicated. We do not appear to have obtained its romantic disposition except that there is depth in its music.

The upshot of the above experiment, as far as *Kafi raga* is concerned, is that it does create the moods that have been traditionally associated with it.

At this stage, it is necessary to note the findings of the already quoted parallel study by the Keils in the USA on American respondens. They report that in the case of *Kafi*, "the feeling of religious joy at the Hindu spring festival, as expressed by Ravi Shanker, generates confusion, ambivalence or indifference among uninitiated Westerners.... (There) are all symptoms of a shaky analysis or what might be called "meaning vacuum".... In sum, our respondents, considered as a group, were mystified by *Kafi-Holi* and our semantic differential data reflect this mystification quite accurately" (Keil and Keil, ibid).

The comparison of our findings on Indian respondents with those of the Keils on Westerners points out interesting hypotheses for further research on the topic.

Misra Mand: Figure 2, Tables 4 and 8.

The intended mood of *Misra Mand raga*, as stated earlier is one of lighter vein, and rarely, if at all, is serious music rendered in it. It is said to stand for no deep emotions.

From the Dimensions of Meaning of this *raga*, the following moods in order of their importance seem to have been created in the respondents:

1. It has a pleasing and gay atmosphere (Factor I, VII).
2. It is refreshing and light (Factor (II).
3. There is no 'newness' in it; that is, it is usual (Factor III).

4. Its affect is sweet (Factor IV).
5. It is not 'agitating' (Factor V).
6. It has depth (Factor VI).

As in the case of the previous *raga*, a comparison of the intended and the created mood for *Misra Mand* shows clearly that there is quite a bit of similarity between the two. The lighter vein of the *raga* seems to have been fully communicated. In terms of the Keils, American respondents, however, have stressed its 'warmth' like mood. Another difference between the Indian and American respondents concerns its dimension of 'newness'. We find it 'usual' while Americans find it 'unusual'. This may be due to the fact that the *raga* being 'folk' here might have been felt as novel there. Interesting hypotheses can be deduced from these findings about 'culture' and music.

Puriya Dhanasri: Figure 3. Tables 5 and 9.

As in the previous cases, in this case also we restate the intended mood of the *raga* — physically tired, evening, longing, grave, dark and somber.

The following created moods in order of their importance come out of the Dimensions of Meaning for *Puriya Dhanasari:*

1. It has sweet, colourful, deep and heavy affect (Factor I).
2. It reflects stability (Factor II).
3. It has sanctity, a sort of sacredness (Factor III).
4. It has a cloudy atmosphere (Factor IV).
5. It has no vigour,is rather weary (Factor V).
6. It has no vitality (Factor VI).

Once again through present experimentation we can see a close similarity between intended and created moods. There are clear indications that its affect is sweet and colourful and it is stable in its formation. Moreover, the moods of sobriety, weariness and darkness are also being communicated with the same piece. It is interesting to note that the Keils also found for Westerners, "weary", "somber" or "heavy" moods on this *raga*. A noteworthy point of departure between the findings of these two studies, however, is that while Westerners "disliked" the music, Indians felt it rather "sweet" and deep.

Rageshri: Figure 4, Tables 6 and 10.

For this *raga* the intended moods were, night, dark, somber, profound, deep, and moving. The following created moods stand out of its Dimensions of Meaning:

1. It has sweet, soothing and deep affect (Factor I).
2. It has negative vigour, that is, weary. Further along, with being weary, it is cloudy and has a darker atmosphere (Factor II).
3. Its formation is stable (Factor III), and it is calm (Factor IV).
4. There is no novelty about it (Factor V).
5. It is not flexible (Factor VI).

Discussing on the lines of the previous cases, it is concluded that the intended mood is almost similar to the created mood. The Keils also report similar findings.

Concluding Remarks

The research reported in the preceding pages was exploratory in nature. The purpose was to exemplify a methodology in current use in the behavourial sciences and to seek an experimental approach for identifying intrinsic powers of music to arouse feelings and emotions in the listener. Both the sample of stimulus and the sample of respondents were delimited within the present scope. Though more analysis could be performed on this very data, it was kept to the minimum must.

The results interpreted above do show that the technique in question shows great promise for further well-controlled and extensive research in the field of music on larger samples of respondents. This is also being planned by the authors of the present paper, for different *ragas* and on different excerpts of the same *raga*. It is felt that the above findings will definitely stimulate the type of researchers in music for whom these were intended.

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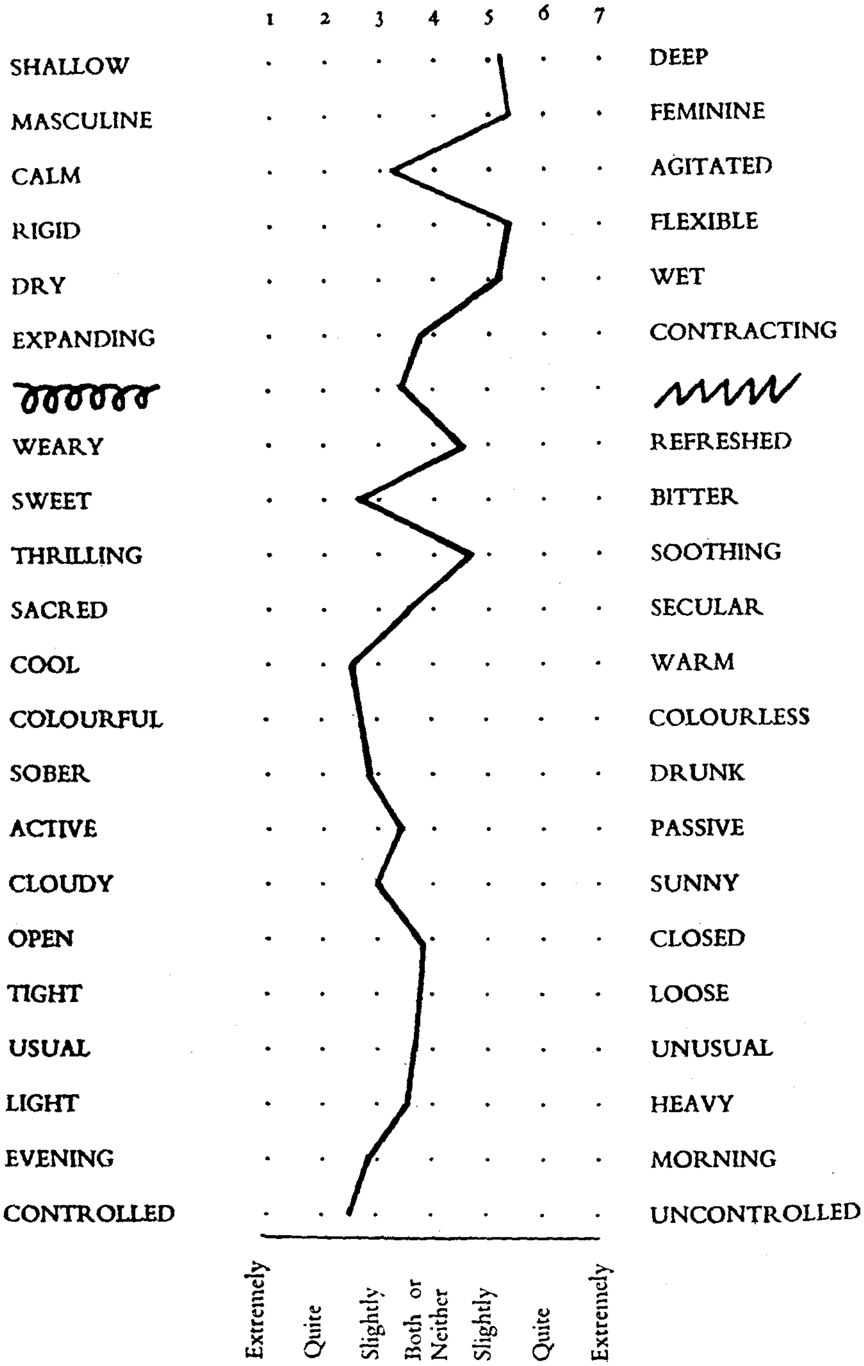


FIGURE 1: KAFI Profile: Plotted averages of response of the participants to each of the bipolar adjective scales.

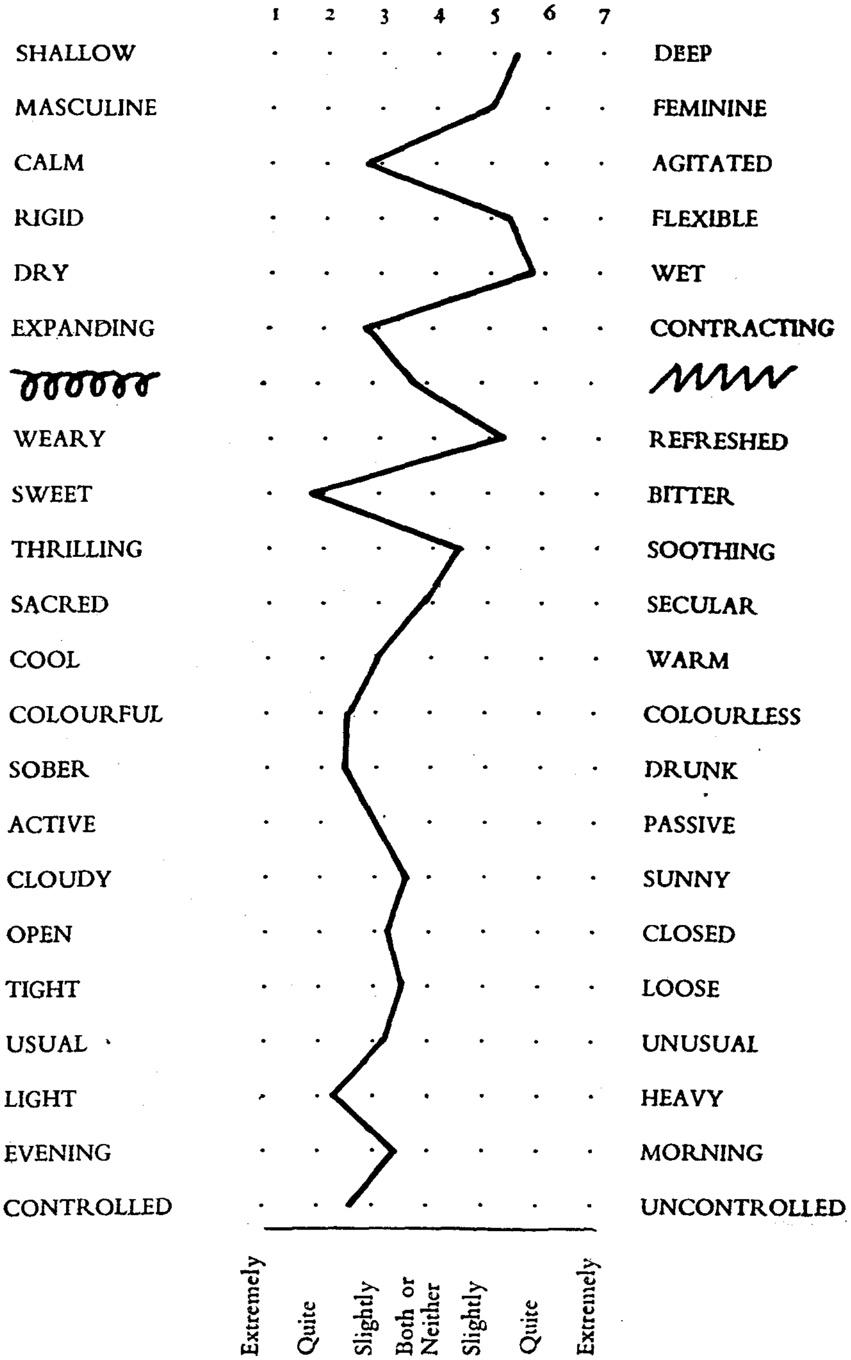


FIGURE 2: **MISRA MAND Profile:** Plotted averages of response of the participants to each of the bipolar adjective scales.

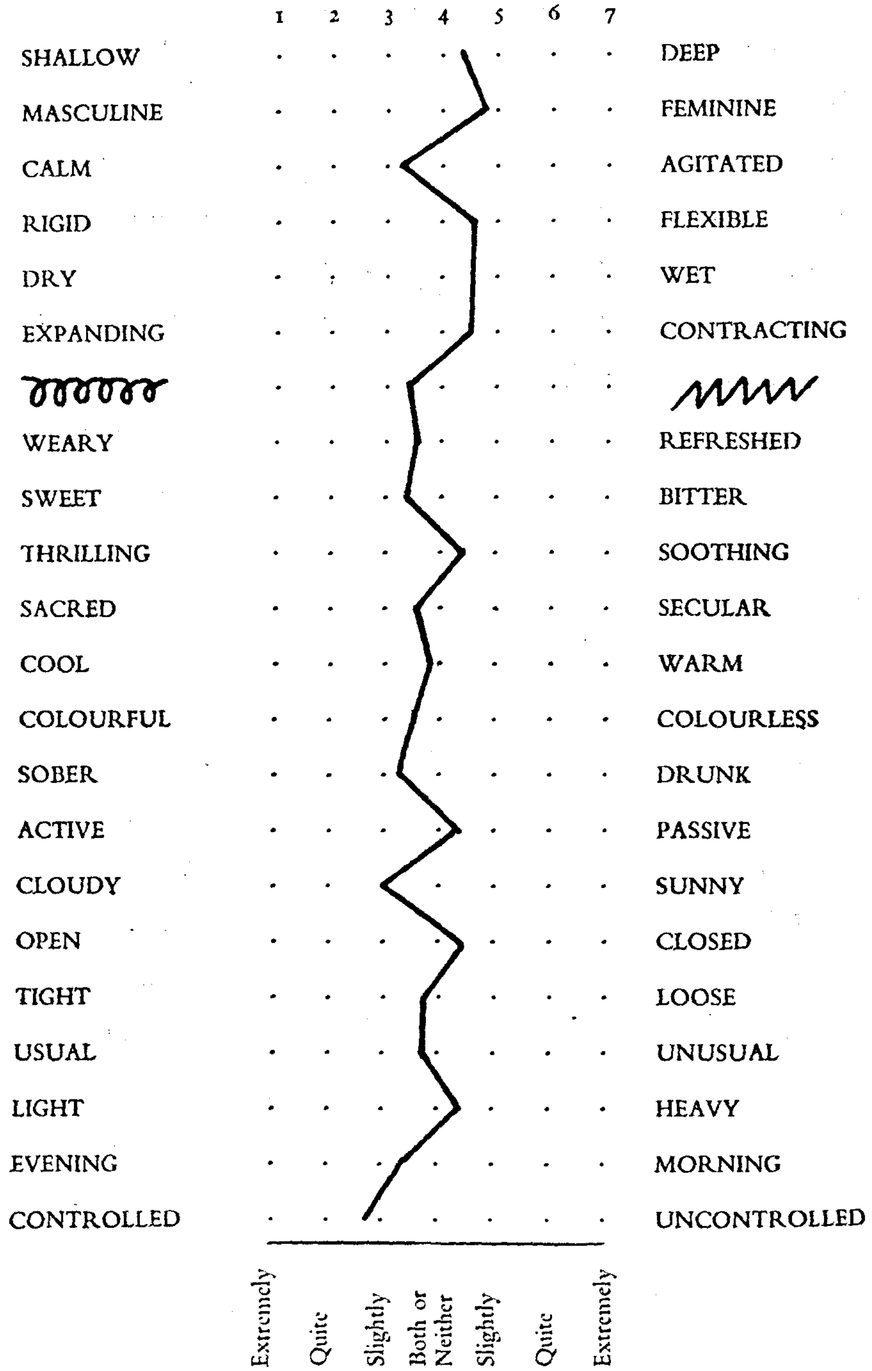


FIGURE 3: **PURIYA DHANASRI Profile:** Plotted averages of response of the participants to each of the bipolar adjective scales.

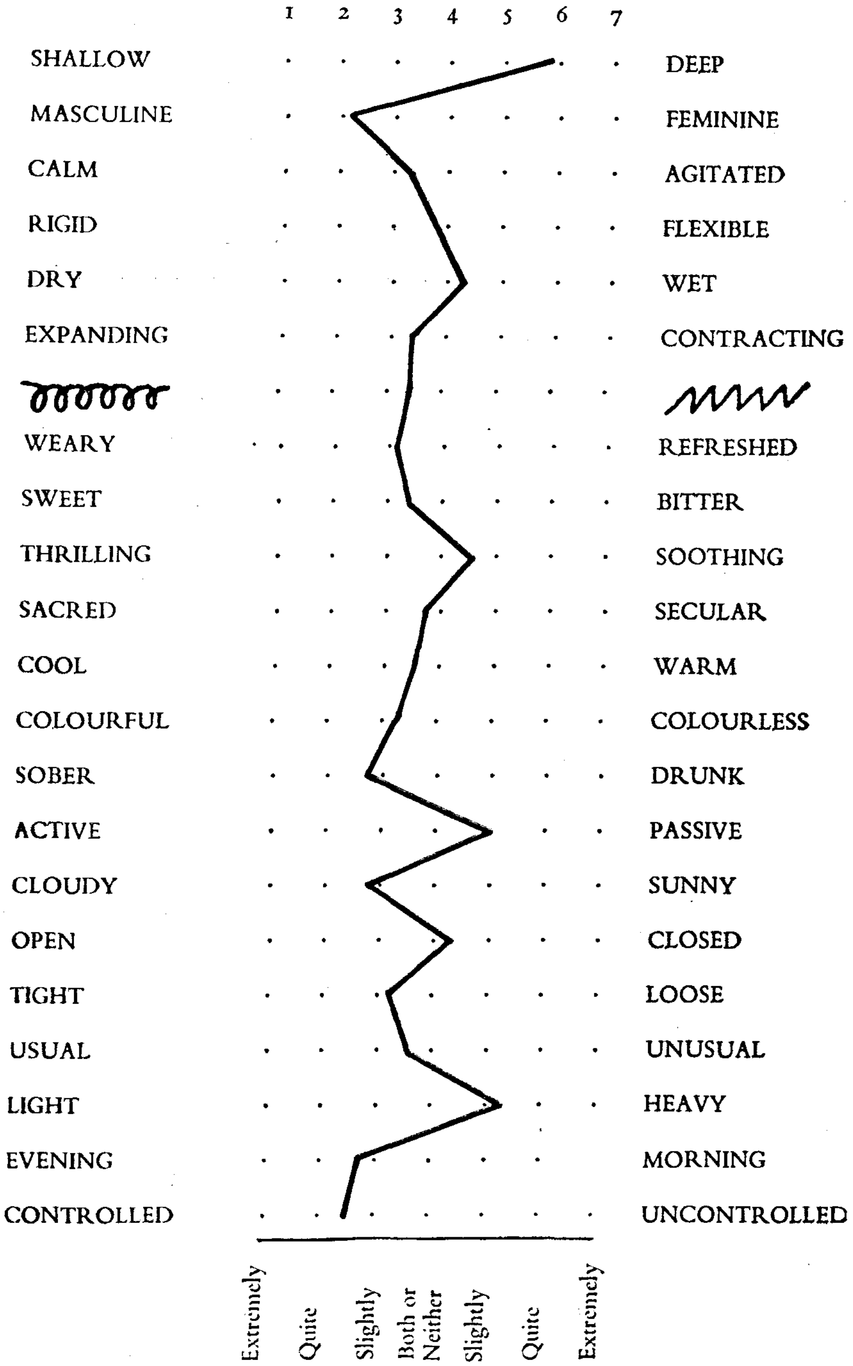


FIGURE 4: **RAGESHRI Profile:** Plotted average of responses of the participants to each of the bipolar adjective scales.

TABLE 3

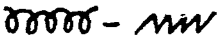
KAFI: Table of Factor Loadings by Method of Principal Components with Unities Entered in the Diagonal Cells*

Sr. No.	*Adjective Scales*	*Principal Factors*						
		I	*II*	*III*	*IV*	*V*	*VI*	*VII*
1.	Shallow-Deep	-11	25	-02	73	21	14	-04
2.	Masculine-Feminine	-06	51	09	09	25	-48	32
3.	Calm-Agitated	47	31	-26	-54	-19	02	17
4.	Rigid-Flexible	-09	47	-43	12	-32	-13	25
5.	Dry-Wet	-32	65	-01	-08	-32	18	-13
6.	Expanding-Contracting	25	43	44	-17	36	-18	-45
7.	[redacted]	06	-17	-13	03	14	78	-29
8.	Weary-Refreshed	-70	20	13	04	25	22	12
9.	Sweet-Bitter	74	-13	-16	23	-02	18	10
10.	Thrilling-Soothing	-04	-16	80	13	06	-18	-01
11.	Sacred-Secular	52	46	03	-24	-33	11	-02
12.	Cool-Warm	47	-22	-13	-27	57	18	23
13.	Colourful-Colourless	79	-25	00	-07	-18	-17	-07
14.	Sober-Drunk	-06	49	-32	-48	28	13	-14
15.	Active-Passive	75	00	-06	28	-10	-21	-04
16.	Cloudy-Sunny	-35	-36	13	-68	19	-14	17
17.	Open-Closed	65	53	15	02	14	-06	-30
18.	Tight-Loose	-43	-39	-54	06	-27	-25	-27
19.	Uusual-Unusual	31	-07	-37	12	34	-21	-21
20.	Light-Heavy	67	-18	17	12	03	26	46
21.	Evening-Morning	21	-61	12	-22	-22	-12	-30
22.	Controlled-Uncontrolled	02	-11	-65	12	47	-25	-04

* Each figure within the table has a decimal point before it, which has been omitted to save space.

TABLE 4

MISRA MAND: Table of Factor Loadings by Method of Principal Components with Unities Entered in the Diagonal Cells*

Sr. No.	*Adjective Scales*	*Principal Factors*						
		I	*II*	*III*	*IV*	*V*	*VI*	*VII*
1.	Shallow-Deep	¯48	¯17	¯14	25	¯26	¯36	¯06
2.	Masculine-Feminine	¯14	¯03	66	13	39	¯19	¯30
3.	Calm-Agitated	¯43	22	25	14	¯01	30	¯13
4.	Rigid-Flexible	¯22	¯50	07	29	19	¯23	32
5.	Dry-Wet	09	¯43	¯46	18	36	¯21	¯04
6.	Expanding-Contracting	49	¯12	17	44	¯26	¯16	¯04
7.		34	05	¯02	27	¯40	46	¯12
8.	Weary-Refreshed	¯30	¯69	¯03	14	25	¯03	¯07
9.	Sweet-Bitter	43	22	27	59	¯17	03	15
10.	Thrilling-Soothing	57	¯19	¯16	15	¯15	¯21	12
11.	Sacred-Secular	14	¯38	¯42	¯31	¯03	30	27
12.	Cool-Warm	52	01	19	¯48	17	¯01	¯24
13.	Colourful-Colourless	50	¯33	12	¯14	34	12	46
14.	Sober-Drunk	¯41	41	¯27	09	42	30	20
15.	Active-Passive	53	32	22	¯22	36	¯04	¯22
16.	Cloudy-Sunny	¯58	¯24	25	¯36	¯18	28	¯16
17.	Open-Closed	59	¯19	¯27	¯04	19	¯10	¯45
18.	Tight-Loose	¯16	31	¯48	43	39	28	¯17
19.	Usual-Unusual	¯20	19	¯64	¯07	¯17	¯35	¯40
20.	Light-Heavy	22	66	¯38	¯27	¯07	¯14	28
21.	Evening-Morning	30	¯11	¯15	42	12	46	¯22
22.	Controlled-Uncontrolled	¯14	70	15	23	24	¯33	19

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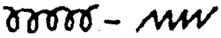
* Each figure within the table has a decimal point before it, which has been omitted to save space.

TABLE 5

PURIYA DHANASRI: Table of Factor Loadings by Method of Principal Components with Unities Entered in Diagonal Cells*

Sr. No.	*Adjective Scales*	*Principal Factors* I	II	III	IV	V	VI	VII
1.	Shallow-Deep	-67	-27	01	05	-26	-07	30
2.	Masculine-Feminine	-49	-20	-17	-22	-47	48	-09
3.	Calm-Agitated	69	15	-21	26	-33	-13	17
4.	Rigid-Flexible	-63	07	01	-23	-40	-15	-10
5.	Dry-Wet	-64	05	-30	-17	-10	-36	17
6.	Expanding-Contracting	57	-21	-02	-04	-14	-34	45
7.		39	04	-46	-50	23	06	-26
8.	Weary-Refreshed	-44	-21	15	06	52	-32	-09
9.	Sweet-Bitter	79	25	-10	-09	-09	-22	-05
10.	Thrilling-Soothing	-15	-27	39	-51	39	-38	06
11.	Sacred-Secular	15	03	55	33	-48	-22	-22
12.	Cool-Warm	30	-50	-39	47	02	14	00
13.	Colourful-Colourless	81	24	18	07	13	-03	-14
14.	Sober-Drunk	-01	67	-53	-16	09	08	13
15.	Active-Passive	50	-13	46	-30	07	35	26
16.	Cloudy-Sunny	-07	24	-04	67	41	22	10
17.	Open-Closed	68	-07	27	-42	-23	19	02
18.	Tight-Loose	-36	61	-02	14	-19	-37	-13
19.	Usual-Unusual	12	55	25	-03	-02	00	-37
20.	Light-Heavy	76	-14	-17	07	-09	-33	11
21.	Evening-Morning	-31	48	59	18	04	18	30
22.	Controlled-Uncontrolled	-06	72	-09	-26	05	11	38

* Each figure within the table has a decimal point before it, which has been omitted to save space.

TABLE 6

RAGESHRI: Table of Factor Loadings by Method of Principal Components with Unities Entered in Diagonal Cells*

Sr. No.	*Adjective Scales*	*Principal Factors*						
		I	*II*	*III*	*IV*	*V*	*VI*	*VII*
1.	Shallow-Deep	-51	-27	-42	14	-18	01	14
2.	Masculine-Feminine	-42	32	08	08	19	22	48
3.	Calm-Agitated	46	05	33	58	-26	-13	-02
4.	Rigid-Flexible	-48	-32	22	04	17	-39	-03
5.	Dry-Wet	-74	-13	07	42	-15	-11	-17
6.	Expanding-Contracting	33	10	-38	45	19	-27	32
7.	[redacted]	22	43	-08	10	-49	-32	46
8.	Weary-Refreshed	-44	65	-20	21	09	-10	-10
9.	Sweet-Bitter	79	-11	05	-29	03	03	-12
10.	Thrilling-Soothing	-63	-47	-12	-18	-10	-39	11
11.	Sacred-Secular	33	09	40	04	27	-23	-21
12.	Cool-Warm	09	46	-46	15	02	41	-14
13.	Colourful-Colourless	55	09	44	-21	01	-30	22
14.	Sober-Drunk	30	28	11	55	-16	00	-47
15.	Active-Passive	45	-46	-19	-15	-34	-05	-22
16.	Cloudy-Sunny	19	66	09	-34	-26	07	28
17.	Open-Closed	54	-33	-40	14	37	-26	17
18.	Tight-Loose	-29	-38	42	-04	-22	44	16
19.	Usual-Unusual	13	-11	10	15	70	31	16
20.	Light-Heavy	36	-42	-22	10	-37	32	11
21.	Evening-Morning	-47	50	31	-22	-01	-11	-19
22.	Controlled-Uncontrolled	03	-31	58	47	-07	18	30

* Each figure within the table has a decimal point before it, which has been omitted to save space.

TABLE 7

KAFI : Dimensions of Meaning[1]

Factor	*Bi-polar Adjective Scales on which appreciably loaded, in terms of lettering notation for amount of loading, and responded order of polarity*	*Amount of variance explained (percent)*	*Total variance explained upto this factor (percent)*	*Suggested Name[2]*	*Pole*
I.	**Colourful-Colourless★, Active-Passive★, Sweet-Bitter★, Refreshed-Weary, Light-Heavy, Open-Closed,** Sacred-Secular, (calm-agitated), (cool-warm), (tight-loose), and (cloudy-sunny)	20·2	20·2	Affect भाव	+
II.	**Wet-Dry, Evening-Morning,** Open-Closed, Masculine-Feminine, (sober-drunk), (flexible-rigid), (sacred-secular), (expanding-contracting), (tight-loose), and (cloudy-sunny)	13·2	33·4	Humidity आर्द्रता	+
III.	**Soothing-Thrilling★, Controlled-Uncontrolled,** Tight-Loose, (expanding-contracting), (flexible-rigid), and (usual-unusual)	10·0	43·4	Tranquillity शांत	+
IV.	**Deep-Shallow★, Cloudy-Sunny,** Calm-Agitated, and (sober-drunk)	8·9	52·3	Depth अगाधता	+
V.	Cool-Warm, (controlled-uncontrolled), and (expanding-contracting)	7·5	59·8	Atmosphere वातावरण	+
VI.	**Rolling-Angular,** and (masculine-feminine)	6·6	66·4	Agitation क्षोभ	—
VII.	(light-heavy), and (expanding-contracting)	5·1	71·5	Density घनता	—

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[1] For fuller description of the tabulated categories please see text.

[2] In order to convey more completely the names suggested by us for the factors, near equivalent in Sanskrit for the same have also been given below their English version.

TABLE 8

MISRA MAND: Dimensions of Meaning

Factor	*Bi-polar Adjective Scales on which appreciably loaded, in terms of lettering notation for amount of loading, and responded order of polarity*	*Amount of variance explained (percent)*	*Total variance explained upto this factor (percent)*	*Suggested Name*	*Pole*
I.	Open-Closed, Cloudy-Sunny, Soothing-Thrilling, Active-Passive, Cool-Warm, Colourful-Colourless, (expanding-contracting), (deep-shallow), (sweet-bitter), (calm-agitated), and (refreshed-weary)	15·4	15·4	Atmosphere वातावरण	+
II.	**Controlled-Uncontrolled, Refreshed-Weary, Light-Heavy,** Flexible-Rigid, (wet-dry), (sober-drunk), and (sacred-secular)	12·5	27·9	Activity क्रियाशीलता	+
III.	**Feminine-Masculine, Usual-Unusual,** (tight-loose), (wet-dry), (sacred-secular), and (light-heavy)	9·9	37·8	Novelty नवीनता	—
IV.	Sweet-Bitter, (cool-warm), (expanding - contracting), (tight-loose), (evening-morning), and (cloudy-sunny)	8·6	46·4	Affect भाव	+
V.	(sober-drunk), (rolling-angular), (feminine-masculine), (tight-loose), and (wet-dry)	6·8	53·2	Agitation क्षोभ	—
VI.	(evening-morning), (rolling-angular), (deep-shallow), and (usual-unusual)	6·7	59·9	Depth अगाधता	+
VII.	(colourful-colourless) (open-closed), and (usual-unusual)	5·8	65·7	Gaiety उल्लास	+

TABLE 9

PURIYA DHANASRI: Dimensions of Meaning

Factor	*Bi-polar Adjective Scales on which appreciably loaded, in terms of lettering notation for amount of loading, and responded order of polarity*	*Amount of variance explained (percent)*	*Total Variance explained upto this factor (percent)*	*Suggested Name*	*Pole*
I.	**Colourful-Colourless*, Sweet-Bitter*, Heavy-Light, Calm-Agitated, Closed-Open, Deep-Shallow, Wet-Dry,** and **Flexible-Rigid**	25·5	25·5	Affect भाव	+
II.	**Controlled-Uncontrolled, Sober-Drunk, Tight-Loose,** Usual-Unusual, Cool-Warm, (evening-morning)	12·0	37·5	Stability स्थिरता	+
III.	Evening-Morning, Sacred-Secular, Sober-Drunk, (rolling-angular), (passive-active), (soothing-thrilling), and (cool-warm)	9·3	46·8	Sanctity पवित्रता	+
IV.	**Cloudy-Sunny,** Soothing-Thrilling, Rolling-Angular, (cool-warm), and (closed-open)	8·7	55·5	Atmosphere वातावरण	—
V.	Weary-Refreshed, (sacred-secular), (feminine-masculine), (cloudy-sunny), (flexible-rigid), and soothing-thrilling)	7·2	62·7	Vigour सत्व, तेजस्	—
VI.	(feminine-masculine), (soothing-thrilling), (tight-loose), (wet-dry), (passive-active)	6·3	69·0	Vitality ओज	—

TABLE 10

RAGESHRI: Dimensions of Meaning

Factor	*Bi-polar Adjective Scales on which appreciably loaded, in terms of lettering notation for amount of loading, and responded order of polarity*	*Amount of variance explained (percent)*	*Total Variance explained upto this factor (percent)*	*Suggested Name*	*Pole*
I.	**Sweet-Bitter, Wet-Dry, Soothing-Thrilling,** Colourful-Colourless, Closed-Open, Deep-Shallow, (rigid-flexible), (evening-morning), (calm-agitated), (passive-active), (weary-refreshed), and (masculine-feminine)	19·4	19·4	Affect भाव	+
II.	**Cloudy-Sunny, Weary-Refreshed,** Evening-Morning, (soothing-thrilling), (cool-warm), (passive-active), (rolling-angular), (heavy-light), and (tight-loose)	13·1	32·5	Atmosphere वातावरण	—
III.	Controlled-Uncontrolled, (cool-warm), (colourful-colourless) (tight-loose), (deep-shallow), (closed-open), (sacred-secular), and (expanding-contracting)	9·1	41·6	Stability स्थिरता	+
IV.	Calm-Agitated, Sober-Drunk, controlled-uncontrolled), (expanding-contracting), and (wet-dry)	8·0	49·6	Agitation क्षोभ	—
V.	**Usual-Unusual,** (rolling-angular), (closed-open), and (heavy-light)	7·1	56·7	Novelty नवीनता	—
VI.	(tight-loose), (cool-warm), (soothing-thrilling), and (rigid-flexible)	6·3	63·0	Flexibility नम्यता	—